EXPERIMENTAL CROSSING OF *AËDES* (*STEGOMYIA*) *PSEUDOSCUTELLARIS* THEOBALD AND *AËDES* (*STEGOMYIA*) *POLYNESIENSIS* MARKS (DIPTERA, CULICIDAE).

By A. R. Woodhill,
Dept. of Zoology, University of Sydney.

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Synopsis.

The results of experiments in crossing *Aëdes* (*Stegomyia*) *pseudoscutellaris* Theobald with *Aëdes* (*Stegomyia*) *polynesiensis* Marks are described, and it is shown that the two species are not genetically isolated, since under laboratory conditions small numbers of fertile hybrids are produced using either species as the female parent. These hybrids have been bred through to the F_2 generation and appear to be normal in every way.

Introduction.

In previous papers (Woodhill, 1949, 1950) accounts have been given of crossing experiments with various species and sub-species of the "scutellaris group" of mosquitoes from Melanesia and Polynesia. Recently E. N. Marks (1951) described a new species, *A. polynesiensis*, with a wide range from Fiji through the Ellice Islands, Samoa, the Society Islands and the Tuamotu Islands. This had previously been confused with *A. pseudoscutellaris*, which is recorded only from Fiji; the two species are separated by Marks on small differences in the scaling of the scutal angle and in the setae of the basal lobe of the male coxite.

During 1953 eggs of *A. polynesiensis* were received from Papeete, Tahiti, and a laboratory colony was successfully established, thus enabling crosses between the two species to be carried out.

Crossing Experiments.

The general technique was similar to that described in previous papers, approximately 130 females and 150 males being used in each experiment, and records being kept until egg production ceased, this usually covering a period of from two to three weeks. The following table gives the results.

Experiment Number.	Species and Sexes.	Number of Eggs Produced.	Percentage of Eggs Hatched.
1	♀ Pol. ×♂ Pseud.	1223	4·8
2	♀ Pseud. ×♂ Pol.	229	5·6
3	♀ Pol. ×♂ Pseud.	1723	36·6
4	♀ Pseud. ×♂ Pol.	530	19·4
5	♀ Pol. ×♂ Pol.	6582	95·2
6	♀ Pseud. ×♂ Pseud.	5948	91·8

Discussion.

It will be seen that crossing occurred between the two species to a limited extent, using either species as the female parent, but that more eggs were produced from ♀ Pol. × ♂ Pseud. than in the reciprocal cross. Total egg production and the percentage of viable eggs was much lower than in a normal colony as exemplified in Experiments 5 and 6.

The hybrids produced were bred through to the F_2 generation and behaved normally in every way. Dr. E. N. Marks kindly examined a series of F_1 hybrids from ♀ Pol. × ♂ Pseud. and these showed considerable variation, but on the whole were intermediate between the parent forms. It would appear therefore that the two species are not genetically isolated, and observations indicate that the low egg production and low viability of the eggs is due to infrequent copulation as compared with a normal colony. As shown previously (Woodhill, 1949), virgin females of this group will deposit sterile eggs but in greatly reduced numbers.

However, where the two species occur together, as in Fiji, it is possible that some crossing would take place under natural conditions and that intermediate forms would occur in the field. It is highly desirable that a close study of the two species in Fiji should be made, and it is hoped that a colony of Fiji *polynesiensis* will be established in order to compare their behaviour (in crossing with *pseudoscutellaris*) with those from Tahiti. On the above evidence it would perhaps be more accurate to consider the two forms as sub-species, rather than to give them full specific rank.

Acknowledgements.

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References.

Marks, E. N., 1951.—The Vector of Filariasis in Polynesia: A Change in Nomenclature. *Ann. Trop Med. & Parasit.*, 45, No. 2: 137-140.

Woodhill, A. R., 1949.—A Note on Experimental Crossing of *Aëdes* (*Stegomyia*) *scutellaris scutellaris* Walker and *Aëdes* (*Stegomyia*) *scutellaris katherinensis* Woodhill. Proc. Linn. Soc. N.S.W., 74, Pts. 5-6: 224-226.

————, 1950.—Further Notes on Experimental Crossing within the Scutellaris Group of Species. Proc. Linn. Soc. N.S.W., 75, Pts. 5-6: 251-253.

CYTOLOGICAL STUDIES IN THE MYRTACEAE. IV.

THE SUB-TRIBE EUCHAMAELAUCINAE.

By S. Smith-White,
Department of Botany, University of Sydney.

(Forty-one Text-figures.)

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Synopsis.

Chromosome numbers are reported for 40 species, representing all genera in the subtribe Euchamaelaucinae.

One or several reducing series in chromosome number occur within the tribe, the haploid complement of 11, found in *Chamaelaucium* and some species of *Verticordia*, probably being primitive. Both *Verticordia* and *Darwinia* include several different basic numbers, and both may prove to be unnatural groups. In *Verticordia*, polyploid series occur on several of the base numbers.

It is necessary to accept the Euchamaelaucinae as a cytologically specialized and derived group within the family. As a consequence, the author's earlier view of the phylogeny of the family is destroyed, and Andrews' earlier conception is strengthened.

Introduction.

In previous papers (Smith-White, 1942, 1948, 1850) it has been claimed that the basic chromosome number in the Myrtaceae is x = 6. Although the haploid number in the family is almost uniformly eleven, this view was initially founded upon observations of the occurrence of secondary association between bivalent chromosomes during meiosis in pollen mother cells and the presence of several nucleoli in meiotic interphase and microspore nuclei. The inference gained some support from records of haploid 12 in the related family Melastomaceae, and appeared to be greatly strengthened by the discovery of an actual haploid 6 in *Darwinia* and *Actinodium*.

As a consequence of the hypothesis it was necessary to infer the cytological primitiveness of the Chamaelaucoideae, or at least of the Euchamaelaucinae, and perhaps polyphyletic origins of the 11-genom in each of the three tribes of the family. Andrews's view (1913) of the evolutionary development of the family was considered to be untenable.

Atchison (1947), unaware of the cytological constitution of *Darwinia*, believed that the remarkable uniformity of chromosome number in the family indicated the ancient and monophyletic origin of the family itself, and of its characteristic chromosome constitution.

Studies by Thomas and Revell (1946) have greatly reduced the significance of secondary association for the inference of secondary polyploidy, and the value of nucleolar number for such inference has also been reduced with an increasing knowledge of the nucleolar cycle in nuclear division. Consequently the author's earlier view now rests mainly upon the occurrence of the haploid number of 6 in *Darwinia*.

Observations.

A summary of the genera and species of the Euchamaelaucinae which have been examined, and of the chromosome number determinations made, is given in Table 1. For convenience, earlier records are also included. Identifications have been made by reference to the Blackall Flora of Western Australia (unpublished), which was made available by Dr. Grieve, and the species names used are those given by Gardner (1931). Taxonomically, the genus *Verticordia* is difficult, and doubt of some identifications is unavoidable. Herbarium material has been lodged in the Departmental Herbarium.

TABLE 1.

Chromosome Numbers in the Euchamaelaucinae.

Genus and Species.	Acc. Number.[1]	State.[2]	Localities.	Chromosome Numbers.		Reference.
				n.	2n.	
Actinodium cunninghamii Schau.	—	W.A.	Albany.	6	12	S.-W. 1950.
Darwinia, Sect. Genctyllis.						
D. hypericifolia (Turcz) Domin.	52/73.	W.A.	Toolgenup, Stirling Ra.	6	—	Text-fig. 1.
D. speciosa (Meissn.) Benth.	S.A.52/105.	W.A.	Blackwood, S.A.,[3] ex. Stirling Ra.	6	12	Text-figs. 2, 3.
D. collina Gardn. ..	S.A.52/102.	W.A.	,, ,, ,,	6	—	Text-fig. 4.
D. leiostyla (Turcz) Domin.	S.A.52/9.	W.A.	Blackwood, S.A.,[3] ex. Bluff Knoll, W.A.	6	—	
D. citriodora (Endl.) Benth.	50/47.	W.A.	Lesmurdie.	6	12	S.-W. 1950.
D. taxifolia A. Cunn. ..	50/63.	N.S.W.	Blackheath.	6	—	S.-W. 1950.
var. *intermedia* (Cunn.) Cheel.	50/15.	N.S.W.	Kuring-gai, Loftus.	6	—	S.-W. 1950.
var. *grandiflora* Benth.	50/18.	N.S.W.	Helensburgh, Bulli.	6	—	S.-W. 1950.
var. *biflora* Cheel ..	50/23.	N.S.W.	Epping, Mt. Colah.	6	—	S.-W. 1950.
D. grandiflora Baker ..	50/28.	N.S.W.	Berowra.	6	—	S.-W. 1950.
D. "*mesembryanthemoides*"[4]	53/8.	N.S.W.	Kariong.	6	—	Text-fig. 5.
D. vestita (Endl.) Benth. ..	50/105.	W.A.	Albany, Frenchman's Bay, Esperance Road.	9	—	Text-figs. 6, 7.
D. pauciflora Benth. ..	52/40.	W.A.	Mullewa.	9	—	Text-figs. 8, 9.
D. diosmoides (D.C.) Benth.	50/112.	W.A.	Albany, Frenchman's Bay.	—	12	
D. fascicularis Rudge ..	49/72.	N.S.W.	Gordon, Loftus, Kuring-gai.	6	12	S.-W. 1950.
D. sp.	S.A.52/7.	S.A.	Blackwood, S.A.,[3] ex. south-east districts.	—	12	Text-fig. 10.
Darwinia, Sect. Schaumannia.						
D. micropetala Benth. ..	S.A.52/6.	S.A.	Pt. Lincoln.	7	14	Text-fig. 11.
Homoranthus virgatus A. Cunn.	53/13.	N.S.W.	Evans Head.	9	—	Text-figs. 12-14.
H. flavescens A. Cunn. ..	—	N.S.W.	Wellington.[5]	9	—	
H. darwinioides (Maid. & Betche) Cheel (=*Rylstonea cernua* Baker).	51/12.	N.S.W.	Lee's Pinch.	9	—	Text-figs. 15, 16.
Verticordia, Sect. Euverticordia.						
V. densiflora Lindl. ..	50/.	W.A.	Cannington.	11	—	
V. plumosa (Desf.) Domin.	50/82. 50/106. S.A.52/103.	W.A.	Gleneagle, Albany.	11	—	Text-fig. 17.
V. sp. (near *plumosa*)[6] ..	50/87.	W.A.	Nedlands.	11	—	Text-fig. 18.
V. brownii (Desf.) D.C. ..	50/64. 50/123.	W.A.	Coorow, Southern Cross.	9	—	Text-figs. 19, 20.
V. nitens (Lindl.) Schau. ..	50/34. 50/88.	W.A.	Gnangara.	8	—	Text-figs. 21, 22.
V. grandiflora Endl. ..	50/58.	W.A.	Coorow.	6	12	Text-fig. 23.
V. chrysantha Endl. ..	S.A.52/110.	W.A.	Blackwood, S.A.[3]	16	—	Text-fig. 24.
V. preissii Schau.	50/60. 50/63. 50/124.	W.A.	Coorow.	8	—	Text-fig. 25.

[1] Reference to Herbarium sheets, Botany Dept. Herbarium.

[2] State to which species are native.

[3] Transplants from nature, grown in Miss E. Ashby's garden, Blackwood, S.A.

[4] An undescribed species. The name used is from an unpublished manuscript by the late Mr. Blakely.

[5] Transplants from nature, grown by Mr. G. Altofer, of Wellington, N.S.W.

[6] [7] Plants growing in the gardens of the University of Western Australia. The material supplied by Miss Baird in 1949, and mentioned in Smith-White (1950), was probably taken from these plants.